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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/764,997	01/26/2004	Thomas Farkas	1465.2009-003	6767
21005	7590	05/06/2005		
HAMILTON, BROOK, SMITH & REYNOLDS, P.C. 530 VIRGINIA ROAD P.O. BOX 9133 CONCORD, MA 01742-9133			EXAMINER ENGLUND, TERRY LEE	
			ART UNIT	PAPER NUMBER
			2816	

DATE MAILED: 05/06/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/764,997

Applicant(s)

FARKAS ET AL.

Examiner

Terry L. Englund

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 June 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-43 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-43 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 June 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Drawings

It is believed Figs. 1–3b should be designated by a legend such as --Prior Art-- because only that which is old is apparently illustrated. For example, page 1, lines 16-17 identify Intersil ISL6526 (shown in Fig. 1, as described on pages 3 (line 15) and 4 (line 6) within the Background of the Invention; Fig. 2 shows “a standard 4-switch charge pump” (e.g. see page 4, lines 18-19); Fig. 3a shows “a typical implementation of a Synchronous Buck DCDC Converter” (e.g. see page 4, lines 25-26); and Fig. 3b shows a variation of Fig. 3a, wherein it is used for “ $V_{cc} > 4.5$ V. Obviously, the manufacturer did not foresee the desirability of using this PWM IC” (e.g. see page 5, lines 11-14), implying the circuit structure is known with respect to its use with 3.3V and 5V input voltages. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled “Replacement Sheet” in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicants will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: At least CT1, CT2, CPGND, OCSET, FB, COMP, ENABLE, BOOT, PHASE, C_{IN} , C_{PUMP} , C_1 , R_F , C_F , R_{OFFSET} , R_{FB} , D_{BOOT} , C_{BOOT} , C_{DCPL} , R_{OCSET} , C_{BULK} , and C_{HF} are shown in each of Figs. 3a-4, with many of them also shown in Fig 1. However, why are none of these mentioned, or described, in the disclosure? R1 of Figs. 6, 7 and 9 is not mentioned within their respective descriptions.

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Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

The title of the invention is not considered descriptive enough, and can be misleading. A new title is required that is clearly indicative of the invention to which the claims are directed. For example, what is considered a "charge pump bypass"? Is the charge pump actually bypassed, or is the pumped output voltage of the charge pump actually what is being clamped? It is suggested the title be changed to --Clamping circuit for a charge pump--.

The abstract of the disclosure is objected to because the abstract's line 4 "the input and output" does not clearly convey what they refer to. It is suggested the phrase be changed to --input and output terminals of the charge pump circuit--, if that is what was meant. Correction is required. See MPEP § 608.01(b).

The disclosure is objected to because of the following informality: It is suggested the continuation/benefit paragraph on page 1 be updated to indicate application 10/763,820 has been abandoned. An appropriate correction is required.

Claim Objections

Claims 2-6, 10-14, and 18 are objected to because of the following informalities: For consistent labeling throughout the claims to minimize possible confusion, it is suggested --circuit-- be added after “clamp” on line 1 of each of claims 2, 10, and 18. Dependent claims carry over any objection(s) from any claim(s) upon which they depend. Appropriate corrections are required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-43 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the applicants regard as the invention. It is not clear in any of independent claims 1, 9, 17, 25, 33, and 41-43, and in dependent claims 7-8, 15-16, 23-24, 31-32, and 39-40, how the output voltage could ever be below the input voltage. For example, since the output voltage is apparently a “pumped” version of the input voltage, under what conditions will the output voltage ever be less than at least the input voltage? It is not understood why apparatus claims 27-30, with their “A charge pump circuit”, depend on method claim 26.

Claims 18-22 each recite “A DC/DC converter as claimed in claim” (13, 14 or 15), wherein none of claims 13-15 recite a converter. Were claims 18-22 meant to depend on claim 17?

Claims 1 and 9 each recites the limitation “the input and output” in line 5. There is insufficient antecedent basis for this limitation in the claim. For example, what does the “input

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and output” actually relate to, the charge pump circuit/controller, pumping capacitance, switches, or clamp circuit?

Similar to claims 1 and 9 above, claim 17 recites the limitation "the input and output" in line 9 with insufficient antecedent basis for this limitation in the claims.

Claim 20 recites the limitation "the comparator" in line 1. There is insufficient antecedent basis for this limitation in the claim.

Claims 23-24 each recites “A charge pump circuit as claimed in claim 17” in line 1, implying the “charge pump circuit” had been previously recited. However, there is insufficient antecedent basis for this limitation in the claims.

Claims 27, and 29-30 each recites “A charge pump circuit as claimed in claim 26”, thus implying the “charge pump circuit” had been previously recited. However, since claim 26 is a method claim that does not even recite a circuit, there is insufficient antecedent basis for this limitation in the claims. [Note: Related to the above problem, claim 28’s “A charge pump circuit” apparently refers back to “A charge pump circuit” of claim 27.]

Claims 34, and 36-38 each recites “A charge pump circuit as claimed in claim 34”, implying the “charge pump circuit” had been previously recited. However, since claim 34 is a method claim that does not even recite a circuit, there is insufficient antecedent basis for this limitation in the claims. [Note: Related to the above problem, claim 36’s “A charge pump circuit” apparently refers back to “A charge pump circuit” of claim 35.]

The term "significantly" in each of independent claims 1, 9, 17, 25, 33, and 41-43 is a relative term which renders the claim indefinite. The term "significantly" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one

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of ordinary skill in the art would not be reasonably apprised of the scope of the invention. For example, since the output voltage of the invention is supposedly a pumped version of the input voltage, why, how, or when would the output voltage ever be below the input voltage, whether “significantly below” or not?

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

In so far as being understood, claims 1-3, 5-11, 13-16, 25, 32, and 41-42 are rejected under 35 U.S.C. 102(b) as being anticipated by Miyamoto et al. (Miyamoto). Fig. 9 shows a charge pump circuit for controlling pumped output voltage V_{pp} (i.e. V_{out}). The circuit comprises pumping capacitance 6-1 – 6-(n-1); switches 5-1 – 5-n, and those understood to be within 4, which effectively vary voltage across the pumping capacitance to provide pumped output voltage V_{pp} from input voltage V_{cc} ; and clamp circuit 2,14 (between input V_{cc} and output V_{out}) that prevents output voltage V_{pp} from being below input voltage V_{cc} (i.e. $V_{pp} > V_{cc}$), anticipating claim 1. Since clamp circuit 2,14 comprises field effect transistor 13 controlled by comparator 15, one known type of amplifier, claims 2-3, and 5-6 are anticipated. Deeming the overall circuit of Fig. 9 a controller (i.e. it controls output voltage V_{pp}), clamp circuit 2,14 prevents output voltage V_{pp} from being below input voltage V_{cc} because it helps to

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maintain, or stabilize, output voltage V_{pp} at a desired level (e.g. see column 8, lines 20-21), thus anticipating claim 7. [Note: When the controller provides a stabilized, desired output level, the controller is not malfunctioning.] Clamp circuit 2,14 stabilizes output voltage V_{pp} , a pumped version of input voltage V_{cc} (i.e. $V_{pp} > V_{cc}$), to its desired level. Therefore, the clamp circuit prevents output voltage V_{pp} from being more than .2 volts below input voltage V_{cc} , anticipating claim 8. Claims 9-11, and 13-16 are anticipated for the same reasons as applied to claims 1-3, and 4-8 described previously. One of ordinary skill in the art would understand boosting circuit 1 of Fig. 9 provides a method for varying voltage across pumping capacitance 6-1 – 6-(n-1) to provide pumped output voltage V_{pp} from input voltage V_{cc} ; and clamping circuit 2,14 clamps output voltage V_{pp} to a desired voltage, thus preventing output voltage V_{pp} from being below input voltage V_{cc} . Therefore, claims 25 and 32 are anticipated. Interpreting Fig. 9 in a slightly different manner, boosting circuit 1 provides a means for varying voltage across pumping capacitance 6-1 – 6-(n-1) to provide pumped output voltage V_{pp} from input voltage V_{cc} ; and clamping circuit 2,14 provides a means for clamping output voltage V_{pp} to a desired voltage, thus preventing output voltage V_{pp} from being below input voltage V_{cc} . This anticipates claims 41 and 42.

In so far as being understood, claims 1-3, 5-11, 13-19, 21-27, 29-35, and 37-43 are rejected under 35 U.S.C. 102(e) as being anticipated by Yamanaka et al. (Yamanaka). Fig. 1 shows a charge pump circuit comprising charge pumping capacitance 3; switches 2 that vary voltage across the pumping capacitance to provide pumped output voltage OUT from input voltage VIN; and clamp circuit 26 (between input 1 and output 12) that prevents output voltage OUT from being significantly below input voltage VIN, anticipating claim 1. Since clamp

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circuit 26 comprises field effect transistor 25 controlled by comparator 13, one known type of amplifier, claims 2-3, and 5-6 are anticipated. Deeming the overall circuit of Fig. 1 a controller (i.e. it controls output voltage OUT), clamp circuit 26 effectively prevents output voltage VOUT from being below input voltage VIN because it effectively allows output voltage OUT to follow input voltage VIN when voltage is initially applied to the circuit. Therefore, except for a possible small voltage drop across transistor 25, output voltage OUT will be substantially equal to input voltage VIN until circuit 27 is brought into full operation. Therefore, the controller will function properly under these conditions, and will not be considered as malfunctioning, anticipating claim 7. Since output voltage OUT is a pumped version of input voltage VIN during operation of circuit 27, and output voltage OUT is substantially equal to input voltage VIN during initial startup, the clamp circuit prevents output voltage OUT from being more than .2 volts below input voltage VIN, and claim 8 is anticipated. Claims 9-11, and 13-16 are anticipated for the same reasons as applied to claims 1-3, and 4-8 described previously. Interpreting Fig. 1 in a slightly different manner, the overall circuit is one type of DC/DC converter, for converting input voltage VIN to pumped output voltage OUT. The converter comprises controlled switches 5; and controller 2,3,30,26, which comprises charge pumping capacitance 3, switches 2 that vary voltage across the pumping capacitance to provide pumped output voltage OUT from input voltage VIN, and clamp circuit 26 (between input 1 and output 12) that prevents output voltage OUT from being significantly below input VCC (as previously described above). Therefore, claim 17 is anticipated. Field effect transistor 25, and comparator/amplifier 13 anticipate claims 18-19, and 21-22. Claims 23-24 are anticipated for the same reasoning as previously described with respect to claims 7-8, respectively. One of ordinary skill in the art would understand charge

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pump circuit 27 provides a method for varying voltage across pumping capacitance 3 to provide pumped output voltage OUT from input voltage VIN; and clamping circuit 26 effectively clamps output voltage OUT to input voltage VIN during initial startup, thus preventing output voltage OUT from being significantly below input voltage VIN. Therefore, claims 25 and 32 are anticipated. Field effect transistor 25 is coupled between input voltage VIN and output voltage OUT, and is controlled by comparator/amplifier 13, anticipating claims 26-27 and 29-30.

Pumped output voltage OUT is applied to controller 30, and the clamping by 26 effectively prevents output voltage OUT from being below input voltage VIN by an amount which would cause the controller to malfunction, anticipating claim 31. [26 allows output voltage OUT to follow input voltage VIN during startup, and once a predetermined level is reached, 30 (and 27) are activated to provide pumped output voltage OUT during normal operations. Since OUT is a pumped version of VIN, it is understood $OUT > VIN$, and therefore output voltage OUT will not be less than input voltage VIN.] In another interpretation of Fig. 1, converter switches 2 vary voltage across pumping capacitance 3 to provide pumped output voltage OUT from input voltage VIN; 26 effectively clamps output voltage OUT to prevent it from being significantly below input voltage VIN; output voltage OUT is applied to controller 30,5 which controls converter switches 2, thus anticipating claim 33. During initial startup, output voltage OUT is effectively clamped by field effect transistor 25, which is controlled by comparator/amplifier 13. Therefore, claims 34-35 and 37-38 are anticipated. Claims 39-40 are anticipated for the same of reasoning as previously described with respect to claims 7-8, respectively. Interpreting Fig. 1 in another manner (e.g. as a charge pump and/or a controller), charge pump circuit 27 provides a means for varying voltage across pumping capacitance 3 to provide pumped output voltage OUT from

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input voltage VIN; and circuit 26 provides a means for effectively clamping output voltage VOUT to input voltage VIN during initial startup, thus preventing output voltage OUT from being below input voltage VIN. This anticipates claims 41-42. Deeming the overall circuit of Fig. 1 as a DC/DC converter, for converting input voltage VIN to pumped output voltage OUT, the converter comprises converter switches 2 as a means for varying voltage across pumping capacitance 3 to provide pumped output voltage OUT from input voltage VIN; 26 provides a means for effectively clamping output voltage OUT to prevent it from being significantly below input voltage VIN (e.g. during initial startup); the connection between output 12 and controller 30 is a means for applying output voltage OUT to controller 30; and 5 provides a means for controlling the converter switches 2 from controller 30, anticipating claim 43.

No claim is allowable as presently written.

Allowable Subject Matter

However, claims 4, 12, 20, 28, and 36 would be allowable if rewritten to satisfactorily overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims. There is presently no strong motivation to modify or combine any prior art reference(s) to ensure the comparator exhibits hysteresis as recited within each of claims 4, 12, 20, 28, and 36.

Prior Art

The other prior art references cited on the accompanying PTO-892 are deemed relevant to at least sections of the claimed inventions. Although not used in any formal rejections described above, both of these references do read on the basic limitations of at least some of the claims. For example, Figs. 2-3 of Raza could have been used to reject at least claims 1-2, 6, 8-

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10, 14-16, 25-26, 30, 32, and 41-42 for the same type of reasoning as described above with respect to the other references used in the formal prior art rejections. [Raza's Fig. 2 shows a block diagram of charge pump circuit 11,12, with clamp 13 clamping output Pumpout with respect to input Vpp. Raza's Fig. 3 shows details, wherein transistors 30 and 32 correspond to clamp 13 of Fig. 2.] Byeon et al.'s Figs. 3-4 could have been used to reject at least claims 1-3, 5-11, 13-16, 25, 32, and 41-42. [Fig. 3 shows charge pump circuit 110 with clamp 120 understood to be coupled between input VCC and output VPP. Fig. 4 shows the details, wherein input VCC is provided to 110 and section 124 of the clamp.] Therefore, these references should be carefully reviewed and considered with respect to the basic limitations recited within the claims.

Any inquiry concerning this communication from the examiner should be directed to Terry L. Englund whose telephone number is (571) 272-1743. The examiner can normally be reached Monday-Friday from 7 AM to 3 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tim Callahan, can be reached on (571) 272-1740.

The new central official fax number is (703) 872-9306.

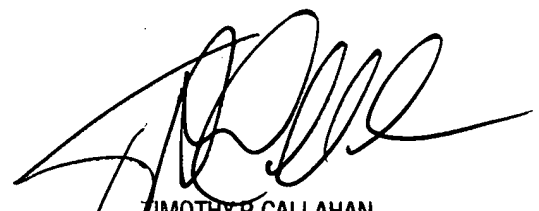
Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (571) 272-1562.

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Terry L. Englund

21 April 2005



TIMOTHY P. CALLAHAN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800

